

Advanced Bionics, Inc.: Saving Lives Using NASA Technology



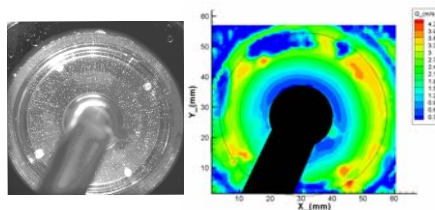
TECHNOLOGY

Particle imaging velocimetry is an advanced planar measurement technique that visualizes instantaneous velocity fields. NASA Glenn used this technique to augment Advanced Bionics' understanding of the hemodynamics within its left ventricular assist device. This powerful experimental method validated the company's computational fluid dynamic models.

COMMERCIAL APPLICATION

Advanced Bionics, Inc., a small Minnesota company, develops and manufactures a novel bearing and seal-free, centrifugal pumps for a variety of industrial applications, including electronic cooling and delicate fluid handling. Advanced Bionics also has expertise in applying their pump for chemical waste processing and pumping two-phase flows. Advanced Bionics recently extended its base technology to develop an advanced rotary Left Ventricular Assist Device. This device will be used to take over the pumping function of the left side of the heart when it has failed.

Recognizing the value that a validated design model and fully tested prototype would bring to a small company, the Garrett Morgan Commercialization Initiative paired Advanced Bionics with researchers at NASA Glenn with expertise in particle imaging velocimetry and computational fluid dynamics. NASA Glenn measured the flow in Advanced Bionics prototype heart assist device, validating their design model.



NASA Glenn's particle imaging velocimetry expertise is enabling new life-saving heart pump technology.

SOCIAL/ECONOMIC BENEFIT

The results of NASA Glenn's tests allowed Advanced Bionics to partner with a leading medical institution, secure significant funding from the National Institutes of Health, and proceed with the next two phases of development. By working with NASA Glenn, Advanced Bionics saved nearly \$1 million in development costs.

In the U.S. alone, nearly 62 million Americans are afflicted with one or more forms of cardiovascular disease, a leading cause of death in the U.S. The estimated annual direct and indirect costs attributed to cardiovascular disease are nearly \$330 billion. Various studies sponsored by the government estimate that the number of Americans who could benefit from some form of mechanical cardiac support system like a left ventricular assist device ranges between 12 to 20 percent of the new cases per year.

NASA APPLICATIONS

The NASA Glenn Research Center's Optical Instrumentation and Non-destructive Evaluation branch uses particle imaging velocimetry to assess fuel mixing and combustion in turbomachinery. The group employs particle imaging velocimetry to investigate noise generating sources in hot, high-speed jet engines and to develop simplified, high thrust propulsion systems.

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